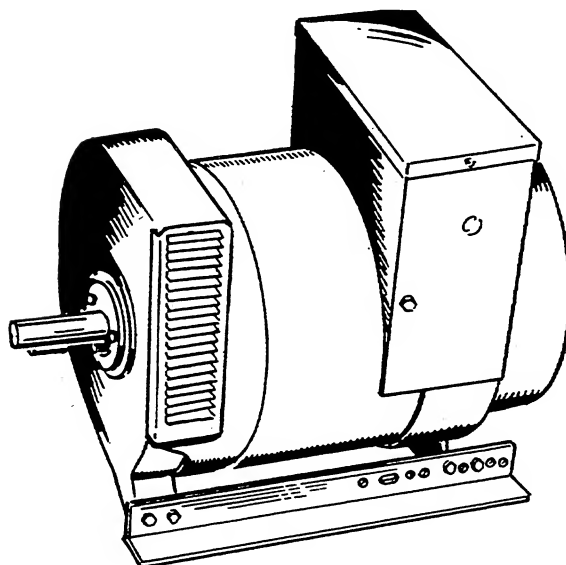


OPERATORS MANUAL AND PARTS CATALOG

FOR
TWO-BEARING
AC ALTERNATORS
YD
SERIES
5.0 THROUGH 20.0 KW



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INTRODUCTION

THIS OPERATOR'S MANUAL CONTAINS INFORMATION PERTAINING TO THE OPERATION AND MAINTENANCE OF YOUR UNIT.

WE SUGGEST YOU KEEP THE MANUAL AND THE WIRING DIAGRAM WHICH ACCOMPANIES EVERY UNIT AND REFER TO IT WHEN MAKING EQUIPMENT ADJUSTMENTS OR ORDERING PARTS. ADDITIONAL COPIES ARE AVAILABLE FOR A NOMINAL CHARGE FROM YOUR DISTRIBUTOR.

WHEN ORDERING PARTS, REMEMBER TO INCLUDE THE MODEL, SPECIFICATION LETTER, AND SERIAL NUMBER LOCATED ON THE UNIT NAMEPLATE. THIS IS ESSENTIAL TO ENSURE THE CORRECT PART IS SHIPPED TO YOU.

FOR REPAIR SERVICE, CONTACT YOUR AUTHORIZED SERVICE REPRESENTATIVE.

WARNING

TO AVOID POSSIBLE PERSONAL INJURY OR EQUIPMENT DAMAGE, A QUALIFIED ELECTRICIAN OR AN AUTHORIZED SERVICE REPRESENTATIVE MUST PERFORM INSTALLATION AND ALL SERVICE.

GENERAL INFORMATION

INTRODUCTION

This instruction book contains information for the proper installation, operation and maintenance of your alternator. We suggest you keep this book handy so it can be referred to when necessary.

If you wish to contact your dealer or the factory regarding this equipment, be sure to supply the complete MODEL and SPECIFICATION NUMBER and the full SERIAL NUMBER to identify your equipment among the many units manufactured.

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SAFETY PRECAUTIONS

The following symbols in this manual signal potentially dangerous conditions to the operator or equipment. Read this manual carefully. Know when these conditions can exist. Then, take necessary steps to protect personnel as well as equipment.

WARNING Onan uses this symbol throughout this manual to warn of possible serious personal injury.

CAUTION This symbol refers to possible equipment damage.

GUARD AGAINST ELECTRIC SHOCK

Remove electric power before removing protective shields or touching electrical equipment. Use rubber insulative mats placed on dry wood platforms over floors that are metal or concrete when around electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surfaces to be damp when handling electrical equipment.

Jewelry is a good conductor of electricity and should be removed when working on electrical equipment.

Use extreme caution when working on electrical components. High voltages cause injury or death.

Follow all state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician.

PROTECT AGAINST MOVING PARTS

Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be permitted because of the danger of becoming caught in moving parts.

Make sure all nuts and bolts are secure. Keep power shields and guards in position.

If adjustments *must* be made while the unit is running, use extreme caution around moving parts, etc.

Do not work on this equipment when mentally or physically fatigued.

SPECIFICATIONS

MODEL NO. AND KW RATING	ELECTRICAL DETAILS			GENERAL UTILITY RATING				
	Frequency In Hertz	Phase	Wires	Watts	kVA at PF	Amps 240 V	Weight Lbs.	(Approx.) kg
6.0-3CS/	60	1	4	6000	6.0 @ 1.0	25.0	235	106.6
7.5-3CS/	60	1	4	7500	7.5 @ 1.0	31.3	259	117.5
10.0-3CS/	60	1	4	10,000	10.0 @ 1.0	41.7	278	126.1
12.5-3CS/	60	1	4	12,500	12.5 @ 1.0	52.0	306	138.8
15.0-3CS/	60	1	4	15,000	15.0 @ 1.0	62.5	331	150.1
17.5-3CS/	60	1	4	17,500	17.5 @ 1.0	72.9	356	161.5
20.0-3CS/	60	1	4	20,000	20.0 @ 1.0	83.3	398	180.5
5.0-53CS/	50	1	4	5000	5.0 @ 1.0	20.8	235	106.6
6.0-53CS/	50	1	4	6000	6.0 @ 1.0	25.0	259	117.5
8.0-53CS/	50	1	4	8000	8.0 @ 1.0	33.3	278	126.1
10.0-53CS/	50	1	4	10,000	10.0 @ 1.0	41.7	306	138.8
12.5-53CS/	50	1	4	12,500	12.5 @ 1.0	52.0	331	150.1
14.5-53CS/	50	1	4	14,500	14.5 @ 1.0	60.4	356	161.5
16.0-53CS/	50	1	4	16,000	16.0 @ 1.0	66.7	398	180.5
6.0-18S/	60	3	12	6000	7.5 @ 0.8		235	106.6
7.5-18S/	60	3	12	7500	9.4 @ 0.8		259	117.5
10.0-18S/	60	3	12	10,000	12.5 @ 0.8		278	126.1
12.5-18S/	60	3	12	12,500	15.6 @ 0.8		306	138.8
15.0-18S/	60	3	12	15,000	18.75 @ 0.8		331	150.1
17.5-18S/	60	3	12	17,500	21.9 @ 0.8		356	161.5
20.0-18S/	60	3	12	20,000	25.0 @ 0.8		398	180.5
5.0-518S/	50	3	12	5000	6.25 @ 0.8		235	106.6
6.0-518S/	50	3	12	6000	7.5 @ 0.8		259	117.5
8.0-518S/	50	3	12	8000	10.0 @ 0.8		278	126.1
10.0-518S/	50	3	12	10,000	12.5 @ 0.8		306	138.8
12.5-518/	50	3	12	12,500	15.6 @ 0.8		331	150.1
14.5-518S/	50	3	12	14,500	18.1 @ 0.8		356	161.5
16.0-518S/	50	3	12	16,000	20.0 @ 0.8		398	180.5

NOTE: All units are two-bearing alternators designed for clockwise rotation with belt and pulley drive or direct drive coupled to a separate prime mover. The direction of rotation is clockwise only; it is determined when facing the drive shaft end. The 60 hertz units operate at 1800 rpm while the 50 hertz units operate at 1500 rpm.

NOTE: The 3CS/ and 53CS/ models are 120/240 volt single phase units. The 18S/ and 518S/ models are three phase broad range reconnectable units.

See Figure 8 for voltage codes, wiring diagram, and connection diagrams. See Figure 4 for dimensions.

DESCRIPTION

GENERAL

Onan YD Series AC alternators 5.0 through 20.0 kW, are two-bearing, 1800 rpm, 50 and 60 hertz units designed for belt and pulley or direct (with coupling) drive with a separate prime mover.

A centrifugal blower, on the front end of the rotor shaft, circulates the alternator cooling air which is drawn in through the end bell cover, over the rotor, and discharged through an outlet at the blower end, Figure 1.

A ball bearing at each end supports the rotor shaft. The end bell and stator housing are attached by four-through-studs which pass through the stator assembly. The brushless exciter stator mounts in the end bell while the exciter rotor and its rotating rectifier assemblies mount on the rotor shaft.

The basic operation of the alternator and voltage regulator involves the stator, voltage regulator, exciter field and armature, a full wave bridge rectifier, and the alternator rotor. Residual magnetism in the rotor and a permanent magnet embedded in one exciter field pole begin the voltage build-up process as the alternator starts running. Single-phase AC

voltage, taken from one of the stator windings, is fed to the voltage regulator as a reference voltage for maintaining the alternator output voltage. The AC reference voltage is converted to DC by a silicon controlled rectifier bridge on the voltage regulator printed circuit board and fed into the exciter field windings. The exciter armature produces three-phase AC voltage that is converted to DC by the rotating rectifier assembly. The resultant DC voltage excites the alternator rotor winding to produce the stator output voltage for the AC load.

VOLTAGE REGULATOR

The line-voltage regulator is an all solid state device; that is, no relays or tubes are needed. Basic components of the voltage regulator are:

- Printed circuit board
- Voltage reference transformer T21
- Commutating reactor CMR21
- Field circuit breaker
- Voltage adjust rheostat (optional)

Figure 2 shows the above components in typical controls on standard units.

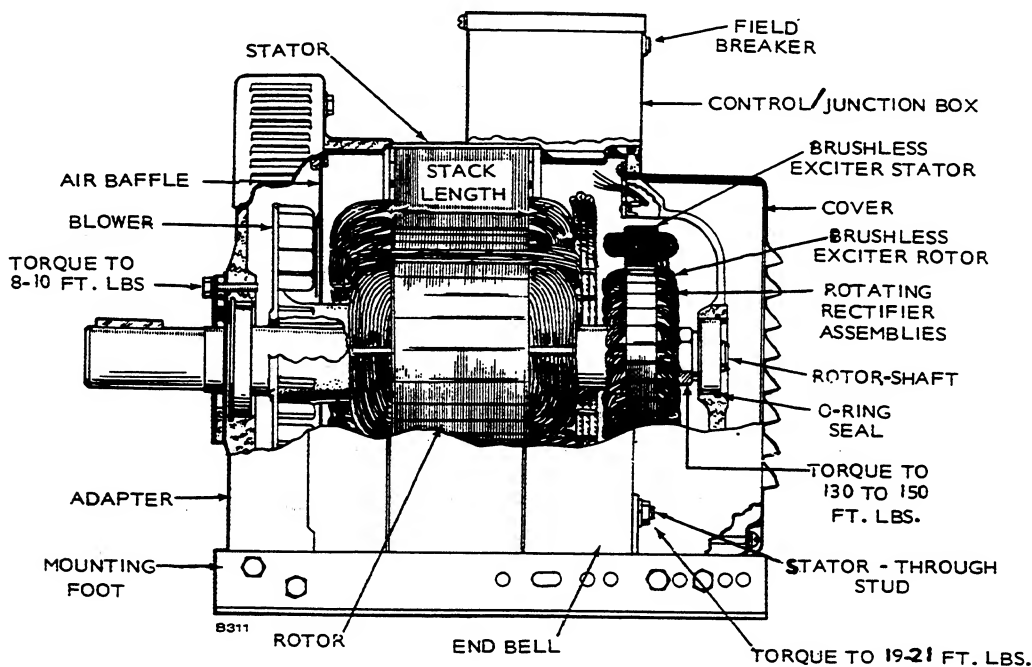
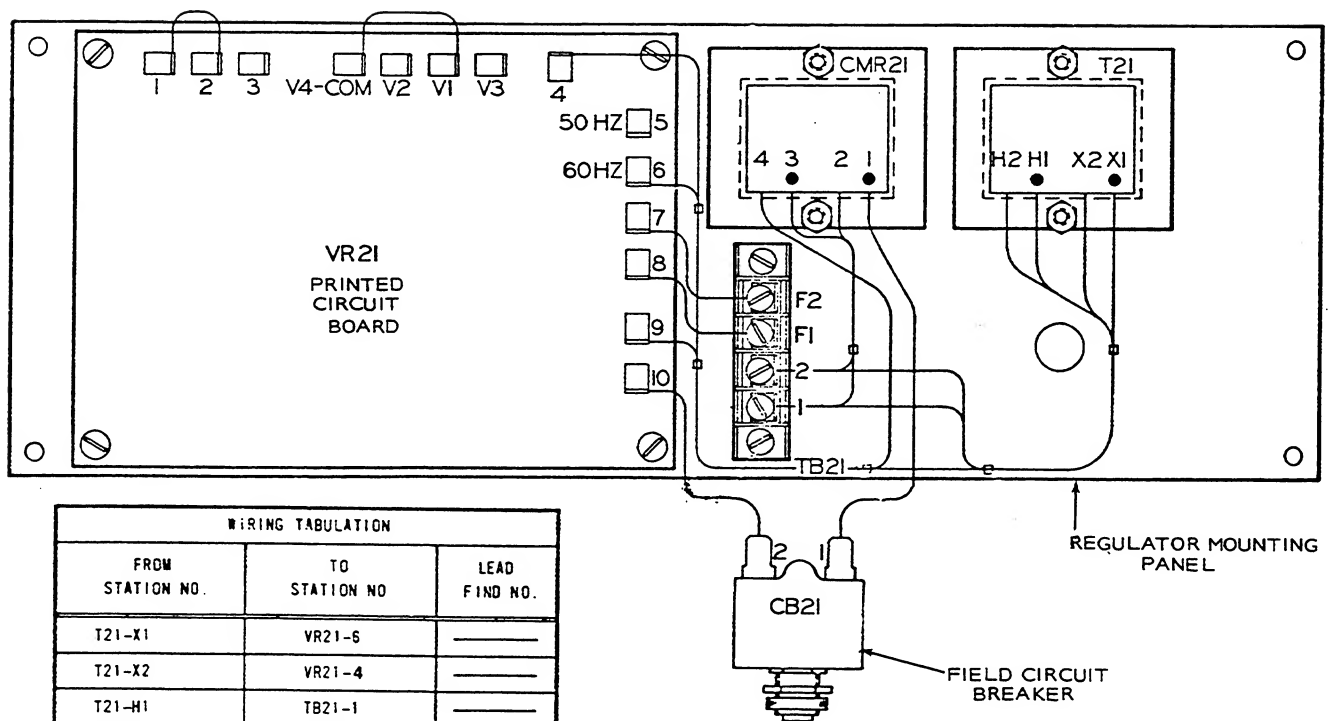


FIGURE 1. GENERATOR (CUTAWAY VIEW)



WIRING TABULATION		
FROM STATION NO.	TO STATION NO.	LEAD FIND NO.
T21-X1	VR21-6	_____
T21-X2	VR21-4	_____
T21-H1	TB21-1	_____
T21-H2	TB21-2	_____
CMR21-1	CB21-1	_____
CMR21-2	TB21-1	_____
CMR21-3	TB21-2	_____
CMR21-4	VR21-9	_____
CB21-2	VR21-10	13
TB21-F1	VR21-8	14
TB21-F2	VR21-7	14
VR21-V4 COM	VR21-V1	15
VR21-1	VR21-2	15

FIGURE 2. VOLTAGE REGULATOR ASSEMBLY

OPTIONAL SWITCHBOARDS

Switchboards (Figure 3) are optional equipment which can be purchased at added cost. They contain a voltmeter, ammeters, line circuit breakers and marked terminals. The switchboard is used to check alternator voltage, load current and voltage regulation with a varying load.

When ordering parts for switchboards, obtain part numbers and description of part from the wiring diagram supplied with the switchboard.

CONTROL BOX

The control box (on top of the alternator) contains the voltage regulator and the lower portion of the junction box for making alternator to load line connections.

The generator output leads are accessible by removing the control box cover.

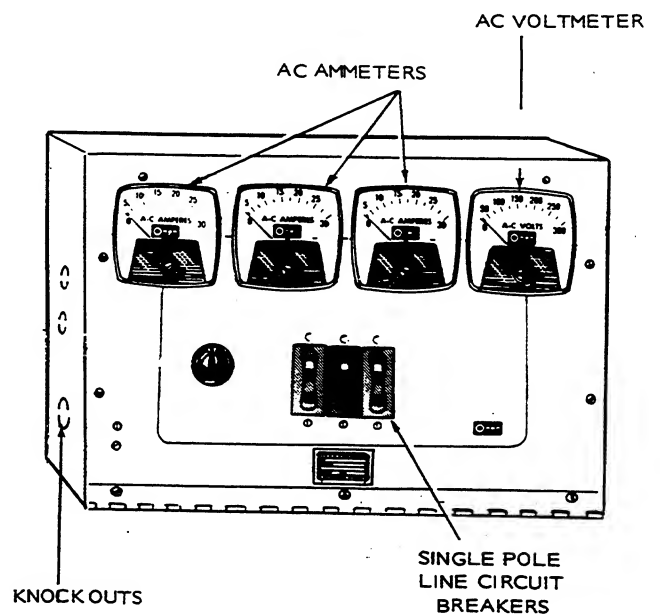


FIGURE 3. TYPICAL WALL MOUNTING "SB" SWITCHBOARD
3 PHASE, 120/208 VOLTS

INSTALLATION

GENERAL

Installations must be considered individually, however, the following installation guidelines should be followed. Installations must conform to local building codes, fire ordinances, and other local, state, and federal regulations.

Installation requirements include:

- Location
- Adequate cooling air
- Mounting
- Direction of rotation
- Driving power
- Wiring connections
- Belt alignment and belt wrap

LOCATION

The proper location of the alternator includes good ventilation, convenience to driving power, good operating conditions and servicing convenience.

VENTILATION — The alternator creates considerable heat when operating under load conditions.

Through proper ventilation, the heat generated by the alternator is dissipated. If the alternator is installed inside a small room or compartment, provide a vent for exhausting heated air. Heated air is discharged through the drive shaft end of the alternator.

CONVENIENCE TO DRIVING POWER — (Driving power is defined as an engine or prime mover of the alternator.) Both the driving source (engine) and the driven counterpart (alternator) must be bolted securely to a heavy mounting base to maintain pulley and shaft alignment. The direction of rotation of the alternator is clockwise as viewed from the drive shaft end.

OPERATING CONDITIONS — Avoid extremely dusty or damp conditions. Protect the alternator against the weather by covering it or moving it to the inside of a building.

SERVICING CONVENIENCE — Allow at least 24 inches of space on all sides of the alternator for convenient servicing.

CAUTION

Overheating of the alternator can result in poor voltage regulation, alternator damage or failure.

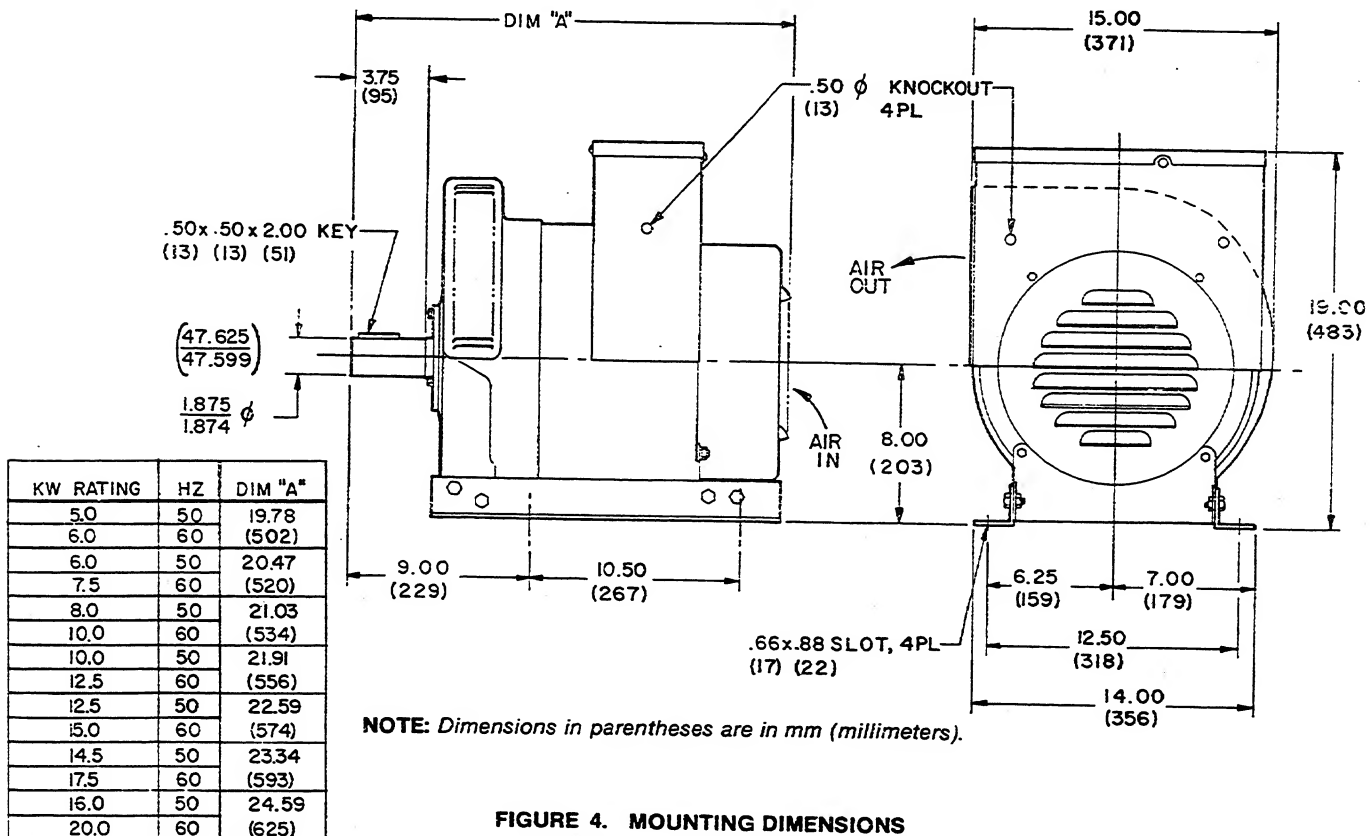


FIGURE 4. MOUNTING DIMENSIONS

MOUNTING

Provide a substantial mounting base of concrete, wood or steel and use large bolts. The mounting surface must be flat so that the mounting brackets are not damaged when tightened into place. It must be possible to turn the alternator shaft by hand after the alternator is bolted down. Refer to Figure 4 for mounting dimensions.

DRIVING POWER

When using an engine as the driving source, consider the following:

ENGINE POWER — The engine must provide a minimum of 2HP for each 1000 watts of alternator output. For example, if operating a 5000 watt alternator, the engine must deliver a least 10HP at the drive shaft. If the engine has a considerable reserve of power, speed regulation and voltage regulation will be more consistent.

ENGINE PULLEY SPEED

Some engines have variable speed governors that regulate engine speed at approximately 8-1/2 to 12%. When the engine is so equipped, governor operation is best at the maximum rated speed of the engine. When the alternator is operating at or near its capacity and the load is suddenly removed, the engine tends to increase speed.

CAUTION The governor does not react fast enough at low speeds to prevent momentary acceleration and high voltage. This can result in serious damage to any electrical equipment left connected to the unit.

The engine must not increase speed too much when a portion of the load is removed. If the engine has a constant speed governor, the speed regulation is 5% or less and the effects described above are not present.

Low alternator speed causes low voltage and frequency. For example, if an 1800 rpm alternator is slowed to 1500 rpm, the frequency of the current produced will be 50 hertz instead of 60 hertz.

CAUTION The combination of low voltage and frequency could result in burned out windings of any compressor motor connected to the alternator such as refrigerators and air conditioners. Under voltage will not damage fans, blowers or pumps, but will cause a T.V. set picture to roll or to have a small picture.

PULLEY SELECTION

Drive and driven pulleys and belt size and length depend on the engine speed and horsepower and the distance between the alternator input shaft and the engine output shaft. For the best possible belt length and pulley to pulley ratio, contact your local Service Center or a belt and pulley dealer. **To obtain the proper voltage and frequency, alternator speed must be 1800 rpm at 60 hertz and 1500 rpm for 50 hertz units. The diameter of the alternator input shaft is 1.875 inches, the square key is .5 x .5 x 2.0 inches.**

BELT ALIGNMENT

The pulleys must rotate in the same plane for longest belt life and lower bearing loads. See Figure 5.

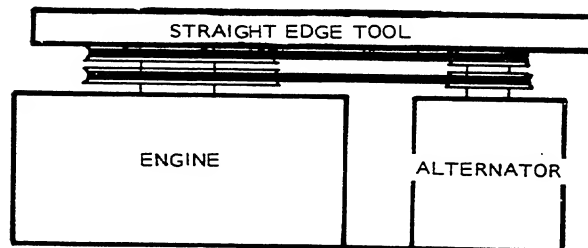


FIGURE 5. BELT ALIGNMENT

BELT WRAP

The greater the degree of belt wrap the less slippage that occurs. The amount of belt wrap should not be less than 160° for satisfactory operation. See Figure 6.

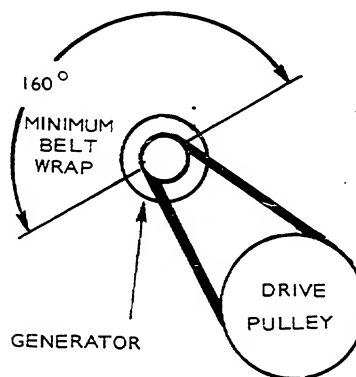


FIGURE 6. BELT WRAP

ELECTRICAL CONNECTIONS

The nameplate on the alternator shows its electrical output rating in watts, volts, and hertz. The wiring diagram, shipped with the alternator shows the electrical circuits and connections needed during installation.

LOAD WIRES

Four 1/2 inch pilot holes with knockout plugs are provided on the sides of the box for using concentric knockout punches to make larger holes. The output leads from the alternator are accessible by removing the control box cover.

CONNECTIONS

1. Use flexible conduit and stranded load wires near alternator to absorb vibration. Use sufficiently large insulated wires.
2. Strip insulation from wire ends as necessary for clean connections.
3. Connect each load wire to the proper alternator output lead inside the box. Insulate bare ends of ungrounded wires.
4. Use bolt provided on the control box to connect the alternator ground lead and load wire.
5. Install a fused main switch (or circuit breaker) between the alternator and load. If a test-run indicates wrong rotating of 3 phase motors in the load circuit, switch the connections at any two alternator load lines (L1, L2, L3).

Standby: If the installation is for standby service, install a double-throw transfer switch (either manual or automatic type) to prevent feeding alternator output into the normal power source lines and to also prevent commercial power and alternator output from being connected to the load at the same time. Instructions for connecting an automatic load transfer switch is included with such equipment. See Figure 7.

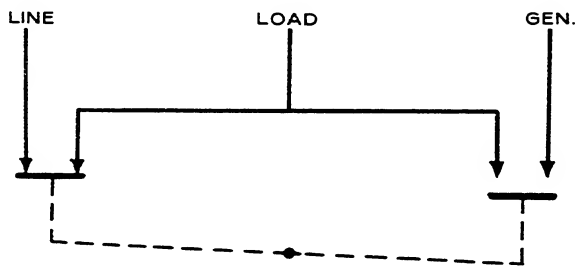


FIGURE 7. LOAD TRANSFER SWITCH

Balance All Loads: Divide the loads equally between output leads. Current loads for any one output lead must not exceed nameplate rating.

CAUTION Overloading can damage the alternator windings.

Single Phase Loads on Three Phase Alternators: Any combination of single phase and three phase loading can be used at the same time as long as the current for any output lead does not exceed the nameplate rating.

Output Lead Markings: Leads on revolving field alternators are marked T¹, T², etc. These identifying marks also appear on the wiring diagram.

RECONNECTIBLE ALTERNATORS

The factory ships all special order alternators completely wired for the voltage code or voltage specified on the customers purchase order. Standard alternators are shipped with the T¹-T⁴ or T¹-T¹² output leads separated in the output box. These single phase and broad range alternators are connectible or later reconnectable to provide the output voltages shown in Figure 8.

Code 3C or 53C Reconnectable Alternators: The single phase, 60 and 50 hertz alternators have output leads T¹, T², T³, and T⁴ available for making the single phase voltage and load connections shown in Figure 8 at the installation site. Grounding procedure should comply with local codes.

Code 18R or 518R Reconnectable Alternators: The three phase, broad range, 60 and 50 hertz 12 lead generators have output leads T¹ through T¹² available for making several single and three phase voltage load connections shown in Figure 8. Grounding procedure should comply with local codes.

When connecting the output leads, be sure to connect jumper W¹⁰ on the voltage regulator printed circuit board between terminal V⁴ (common) and V¹, V², or V³ as listed on the reconnection diagram in Figure 8. Connecting V⁴ to V⁴ also means no connection is needed.

A broad range alternator is capable of generating numerous different output voltages as indicated by the reconnection diagram.

SWITCHBOARD

A wall mounted switchboard containing ammeters, a voltmeter, and circuit breakers is optional. When used, the following connections apply:

1. Connect one ungrounded (hot) alternator lead to the unused terminal on each ammeter.
2. Connect the alternator lead and load wires which are to be grounded to the ground stud on the switchboard.
3. Connect one ungrounded (hot) load wire to the unused terminal on each circuit breaker.
4. On set that generates more than one voltage (example: 120/240), the voltmeter should be wired to indicate the higher of the two voltages.

CAUTION To prevent instrument damage when using a switchboard, contact the Onan factory for required instrument changes, new wiring diagrams, new generator set nameplate with proper specification number and voltage before attempting to reconnect a generator with instruments on the control panel.

Under no circumstances shall the generator be connected in any other manner than shown in Figure 8.

Severe damage will result if leads are incorrectly connected or improperly insulated. Use extreme care in checking leads to assure proper connections.

NAMEPLATE VOLTAGE CODE	VOLTAGE	PHASE	FREQUENCY	CONNECT W/O JUMPER WIRE FROM V4 TO:	GENERATOR CONNECTION	GENERATOR CONNECTION SCHEMATIC DIAGRAM	LOAD TO GENERATOR CONNECTION WIRING DIAGRAM
						CONNECT X1 TO VR21-5 FOR 50 HERTZ AND X1 TO VR21-6 FOR 60 HERTZ GENERATORS.	
3C	120/240	I	60	V1		A-240	A-240
53C	120/240	I	50	V3		B-120	B-120
	115/230	I	50	V2		C-120/240	C-120/240
	110/220	I	50	V1			
18	120/208 127/220 139/240	3	60	V1 V2 V4	PARALLEL WYE		
518	110/190	3	50	V1			
	115/200	3	50	V2			
	120/208	3	50	V3			
	127/220	3	50	V4			
18	240/416 254/440 277/480	3	60	V1 V2 V4	SERIES WYE		
518	220/380	3	50	V1			
	230/400	3	50	V2			
	240/416	3	50	V3			
	254/440	3	50	V4			
18	120/240	3	60	V1	SERIES DELTA		
518	110/220	3	50	V1			
	115/230	3	50	V2			
	120/240	3	50	V3			
18	120/240	I	60	V1	DOUBLE DELTA		
518	110/220	I	50	V1			
	115/230	I	50	V2			
	120/240	I	50	V3			
18	120	I	60	V1	PARALLEL DELTA		
518	110	I	50	V1			
	115	I	50	V2			
	120	I	50	V3			

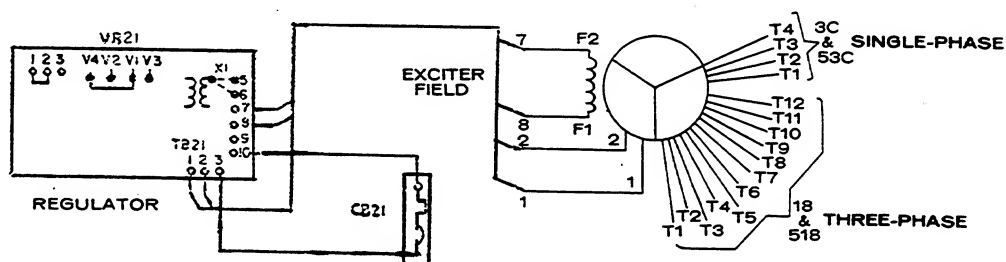


FIGURE 8. ALTERNATOR WIRING AND RECONNECTION DIAGRAMS

OPERATION

STARTING

Start the alternator, and while running at no load, check the voltage. Be sure the alternator is being driven at its nameplate rating (1800 rpm for 60 cycle models, 1500 rpm for 50 cycle models). Make any necessary adjustment to the driving power source so that the alternator speed is correct.

APPLYING LOAD

If practicable, allow driving source to warm up before connecting a heavy load. Continuous alternator overloading may cause high operating temperatures that can damage the windings. The alternator can safely handle an overload temporarily, but for normal operation, keep the load within nameplate rating.

Most installations use a line switch that must be closed to connect a portion of the load.

Connect electrical load after the alternator operates satisfactorily at no load. When connecting electric motors, connect one at a time, allowing each to reach running speed before connecting the next one. Motors require much more current for starting than when running at normal speed. Therefore, if several motors were connected at the same time, the alternator could be so overloaded that none of the motors would start.

If the driving engine governor does not provide good regulation, or if the engine is operating at capacity, it may be necessary to manually adjust the engine throttle control as alternator load is substantially changed.

PERIODIC SERVICE AND INSPECTION

Follow a regular schedule of inspection and servicing. Make a good visual check before, while, and after alternator is operating; look for loose or broken leads and bad connections.

BEARINGS

The ball bearings are double sealed and lubricated for life.

BELT ADJUSTMENT, BELT DRIVE UNITS

Maintain proper belt tension at all times. Too much belt tension causes rapid wear of the belts and places an extra load on the alternator bearings. Belts that are too loose will slip, wear out rapidly and cause the alternator to run at a low speed. Reduced alternator speed causes lower output voltage.

To test the V-belt tension, press down on the belt at a point midway between the driving unit and the alternator while not in operation. It should be possible to press the belt down a slight amount depending on the distance between the pulleys. When more than one belt is used, each belt should show the same tension. When it becomes necessary to replace a worn belt, replace all belts at the same time.

A new belt will stretch slightly when first put into operation. Tension should be checked frequently during the first week or two of operation. After this period, further belt tension adjustment should be minimal.

The driving unit and alternator pulleys must be in alignment. To test alignment place a straight edge tool against the side of the outer driving pulley. See Figure 5. As the straight edge contacts both sides of the driving unit pulley, it should contact both sides of the alternator pulley. Complete contact of both pulleys should be made at the same time.

ALIGNING COUPLING DRIVE UNITS

Coupling direct drive units have the driving unit and alternator shafts in line with each other. If either the driving unit or the alternator is loosened from the base, the loosened unit must be properly realigned when reinstalled.

TROUBLESHOOTING

A few simple checks and a proper troubleshooting procedure can locate the probable source of trouble and cut down troubleshooting time.

1. Check all modifications, repairs, replacements performed since last satisfactory operation of set to be sure that connection of generator leads are correct. A loose wire connection, overlooked when installing a replacement part could cause problems. An incorrect connection, an opened circuit breaker, or a loose printed circuit board are all potential malfunction areas to be eliminated by a visual check.
2. Unless absolutely sure that panel instruments are accurate, use portable test meters for troubleshooting.
3. Visually inspect components on voltage regulator. Look for dirt, dust, or moisture and cracks in the printed solder conductors. Burned resistors, arcing tracks are all identifiable. Do not mark on printed circuit boards with a pencil. Graphite lines are conductive and can cause short circuits between components.

NOTE: For detailed troubleshooting information regarding the alternator and controls contact your local service center for a copy of YD Major Service Manual 900-0184.

TROUBLESHOOTING

NATURE OF TROUBLE	POSSIBLE CAUSE	REMEDY
Alternator Overheats	1. Windings and parts covered with dirt and oil.	1. Disassemble alternator and clean.
	2. Drive belt slipping.	2. Adjust tension or replace.
	3. Air intake is restricted or incoming air too hot.	3. Take necessary steps to allow for proper cooling.
	4. Overloaded.	4. Check load.
Noisy Alternator	1. Alternator loose on base.	1. Tighten mounting bolts.
	2. Defective bearing.	2. Replace. Check alignment.
No Voltage Output	1. Voltage regulator trouble, or open, short or grounded circuit in alternator.	1. Call your local service center.
	2. Alternator leads broken or loose.	2. Tighten connections and replace broken leads.
	3. Broken drive belt.	3. Install new belt and adjust tension (readjust after one hour of operation).
Low Voltage Output of Alternator	1. Speed low because of loose, slipping belts.	1. Adjust belt tension.
	2. External short circuit on line.	2. Test alternator with line wires disconnected.
	3. Open circuit of shunt field winding.	3. Make proper connections.
	4. Short circuit of winding in the field or armature.	4. Call your local service center.


NOTES

PARTS CATALOG

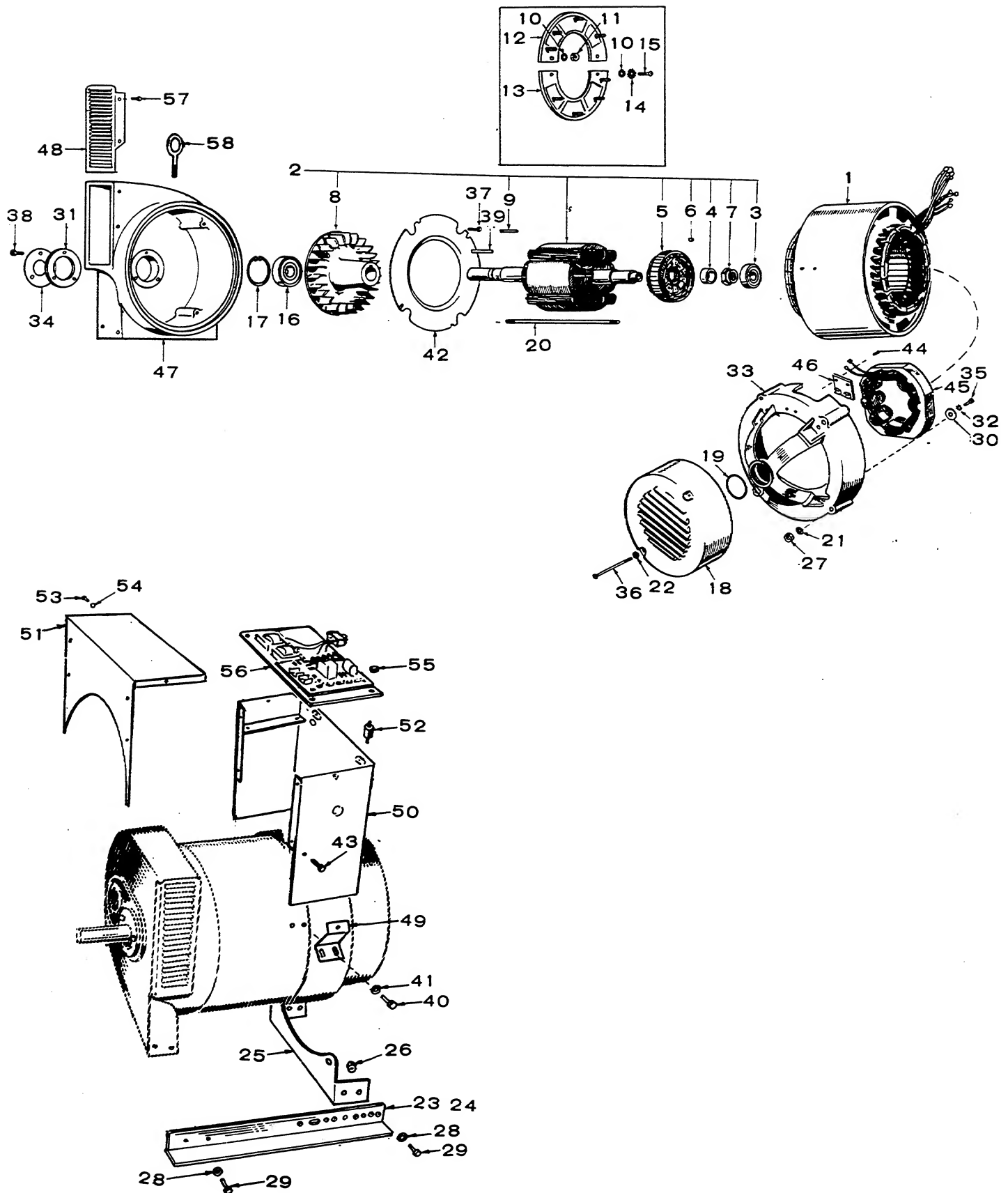
For parts or service, contact the dealer from whom you purchased this equipment or refer to your Nearest Authorized Parts and Service Center.

To avoid errors or delay in filling your parts order, please furnish all information requested.

Always give the MODEL and SPEC NO. and SERIAL NO.

	
ALTERNATOR	
MODEL AND SPEC NO.	
[REDACTED]	
SERIAL NO.	[REDACTED]
IMPORTANT— ALWAYS GIVE ABOVE NO'S WHEN ORDERING PARTS	
A.C. VOLTS	PH. [REDACTED]
K.V.A.	KW [REDACTED]
P.F.	AMPS [REDACTED] Hz [REDACTED]
INSUL-NEMA CLASS	F AMB 40°C
TIME RATING	[REDACTED]
R.P.M.	BAT. [REDACTED]
FOR ELEC. EQPT. ONLY	[REDACTED] LR-3927
MFD. BY ONAN DIV. OF ONAN CORP. MINNEAPOLIS, MINN. U.S.A. 99-1326	

GENERATOR

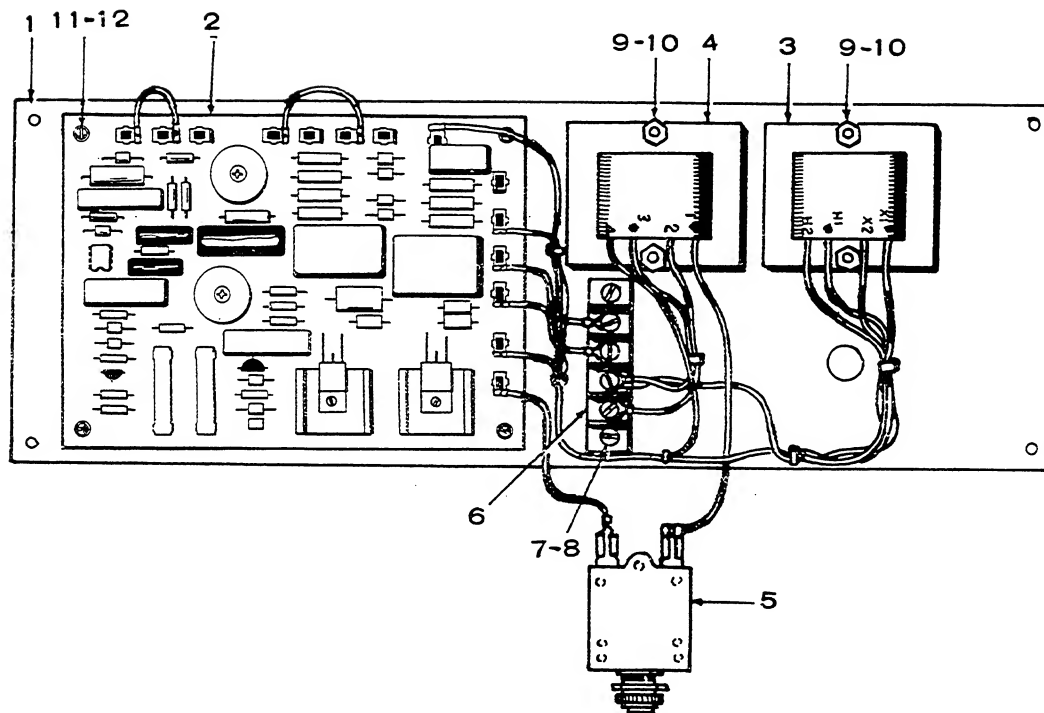


GENERATOR

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	STATOR, WOUND			20	STUD, GENERATOR THROUGH		
	220-2022	1	5.0YD-53CS		520-0794	4	5.0kW, 50 Hertz and 6.0kW, 60 Hertz
	220-2023	1	6.0YD-53CS		520-0795	4	6.0kW, 50 Hertz and 7.5kW, 60 Hertz
	220-2024	1	8.0YD-53CS		520-0796	4	8.0kW, 50 Hertz and 10.0kW, 60 Hertz
	220-2025	1	10.0YD-53CS		520-0797	4	10.0kW, 50 Hertz and 12.5kW, 60 Hertz
	220-2026	1	12.5YD-53CS		520-0798	4	12.5kW, 50 Hertz and 15.0kW, 60 Hertz
	220-2027	1	14.5YD-53CS		520-0799	4	14.5kW, 50 Hertz and 17.5kW, 60 Hertz
	220-2028	1	16.0YD-53CS		520-0800	4	16.0kW, 50 Hertz and 20.0kW, 60 Hertz
	220-2014	1	6.0YD-3CS	21	850-0050	4	Washer, Lock (3/8")
	220-2015	1	7.5YD-3CS	22	850-0040	2	Washer, Lock (1/4")
	220-2016	1	10.0YD-3CS	23	232-2578	1	Foot, Mounting (LH)
	220-2017	1	12.5YD-3CS	24	232-2579	1	Foot, Mounting (RH)
	220-2018	1	15.0YD-3CS	25	232-2452	1	Bracket, Generator Support
	220-2019	1	17.5YD-3CS	26	862-0004	4	Nut, Hex (7/16-14)
	220-2020	1	20.0YD-3CS	27	862-0011	4	Nut, Hex (3/8-16)
	220-2415	1	5.0YD-518S	28	850-0055	8	Washer, Lock (7/16")
	220-2416	1	6.0YD-518S	29	800-0071	8	Screw, Hex Cap (7/16-14 x 1")
	220-2417	1	8.0YD-518S	30	526-0260	2	Washer, Flat (1/4")
	220-2418	1	10.0YD-518S	31	232-2576	1	Retainer, Bearing
	220-2419	1	12.5YD-518S	32	853-0013	2	Washer, Lock ET (1/4")
	220-2420	1	14.5YD-518S	33	211-0256	1	Bell, End
	220-2421	1	16.0YD-518S	34	232-2453	1	Cover, Bearing
	220-2408	1	6.0YD-18S	35	800-0004	2	Screw, Hex Cap (1/4-20 x 5/8")
	220-2409	1	7.5YD-18S	36	812-0165	2	Screw, Round Head (1/4-20 x 4-1/2")
	220-2410	1	10.0YD-18S	37	821-0008	4	Screw, Hex Cap - Flanged (1/4-20 x 5/16")
	220-2411	1	12.5YD-18S	38	800-0007	3	Screw, Hex Cap (1/4-20 x 1")
	220-2412	1	15.0YD-18S	39	515-0212	1	Key (1/2 x 1/2 x 2")
	220-2413	1	17.5YD-18S	40	800-0025	4	Screw, Hex Cap (5/16-18 x 5/8")
	220-2414	1	20.0YD-18S	41	856-1008	4	Washer, Lock - EIT (5/16")
2	ROTOR ASSEMBLY, WOUND (INCLUDES PARTS MARKED *)			42	234-0519	1	Baffle, Air
	201-2335	1	5.0kW, 50 Hertz and 6.0kW, 60 Hertz	43	821-0014	2	Screw, Hex Cap - Flanged (5/16-18 x 1/2")
	201-2336	1	6.0kW, 50 Hertz and 7.5kW, 60 Hertz	44	815-0194	2	Screw, Hex Cap - W/ET (#10-32 x 3/8")
	201-2337	1	8.0kW, 50 Hertz and 10.0kW, 60 Hertz	45	220-2009	1	Stator, Wound, Exciter
	201-2338	1	10.0kW, 50 Hertz and 12.5kW, 60 Hertz	46	232-2418	1	Board, Connection
	201-2339	1	12.5kW, 50 Hertz and 15.0kW, 60 Hertz	47	231-0185	1	Adapter, Generator
	201-2340	1	14.5kW, 50 Hertz and 17.5kW, 60 Hertz	48	234-0522	1	Grille, Air Outlet
	201-2341	1	16.0kW, 50 Hertz and 20.0kW, 60 Hertz	49	301-3909	2	Bracket, Control Box
3	510-0112	1	*Bearing, Rotor (Rear)	50	301-3958	1	Box, Control
4	232-2398	1	*Spacer, Bearing	51	301-3957	1	Cover, Control Box
5	201-2151	1	*Rotor, Wound - Exciter	52	402-0354	4	Mount, Shock - Voltage Regulator Assembly
6	515-0094	1	*Key, Exciter Rotor	53	821-0004	8	Screw, Cap - Hex Head Locking (#10-32 x 5/16")
7	870-0284	1	*Nut, Exciter Rotor Locking	55	870-0221	8	Nut, Hex with ET Lock Washer (#8-32)
8	205-0114	1	*Fan, Generator	56	305-0546	1	Regulator Assembly, Voltage (See separate group for components)
9	515-0051	1	*Key, Fan	57	821-0008	2	Screw, Hex Cap - Flanged (1/4-20 x 5/16")
10	526-0008	12	*Washer, Flat	58	403-0095	1	Eyebolt, Lifting
11	870-0131	8	*Nut, Hex (#10-32)				
12	358-0069	1	*Rectifier Assembly (Positive)				
13	358-0070	1	*Rectifier Assembly (Negative)				
14	853-0008	4	*Washer, Shakeproof (#10)				
15	813-0100	4	*Screw, Round Head (#10-32 x 1/2")				
16	510-0115	1	*Bearing, Ball (Includes Snap Ring)				
17	518-0333	1	*Ring, External Retainer				
18	234-0557	1	Cover, End Bell				
19	509-0094	1	Seal, Bearing ("O" Ring)				

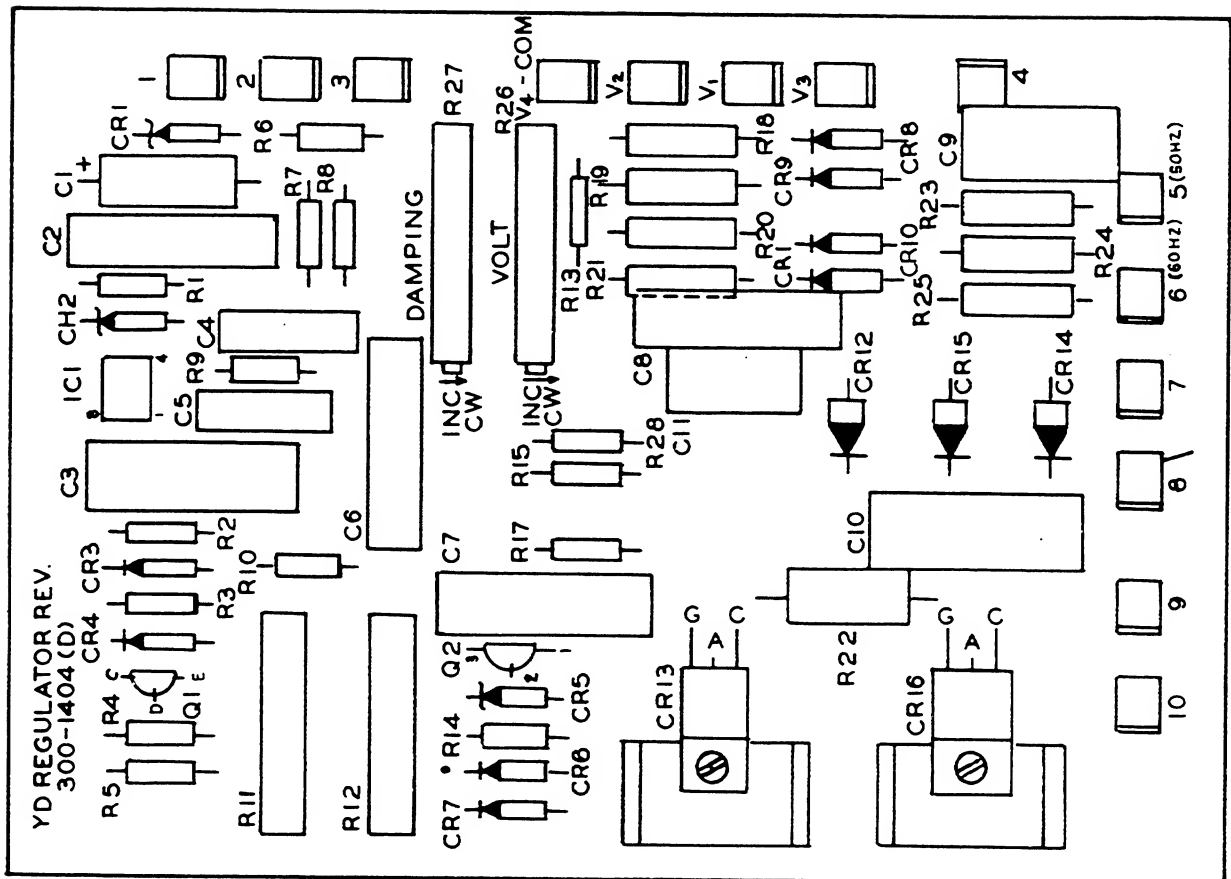
* - Included in Rotor Assembly.

VOLTAGE REGULATOR



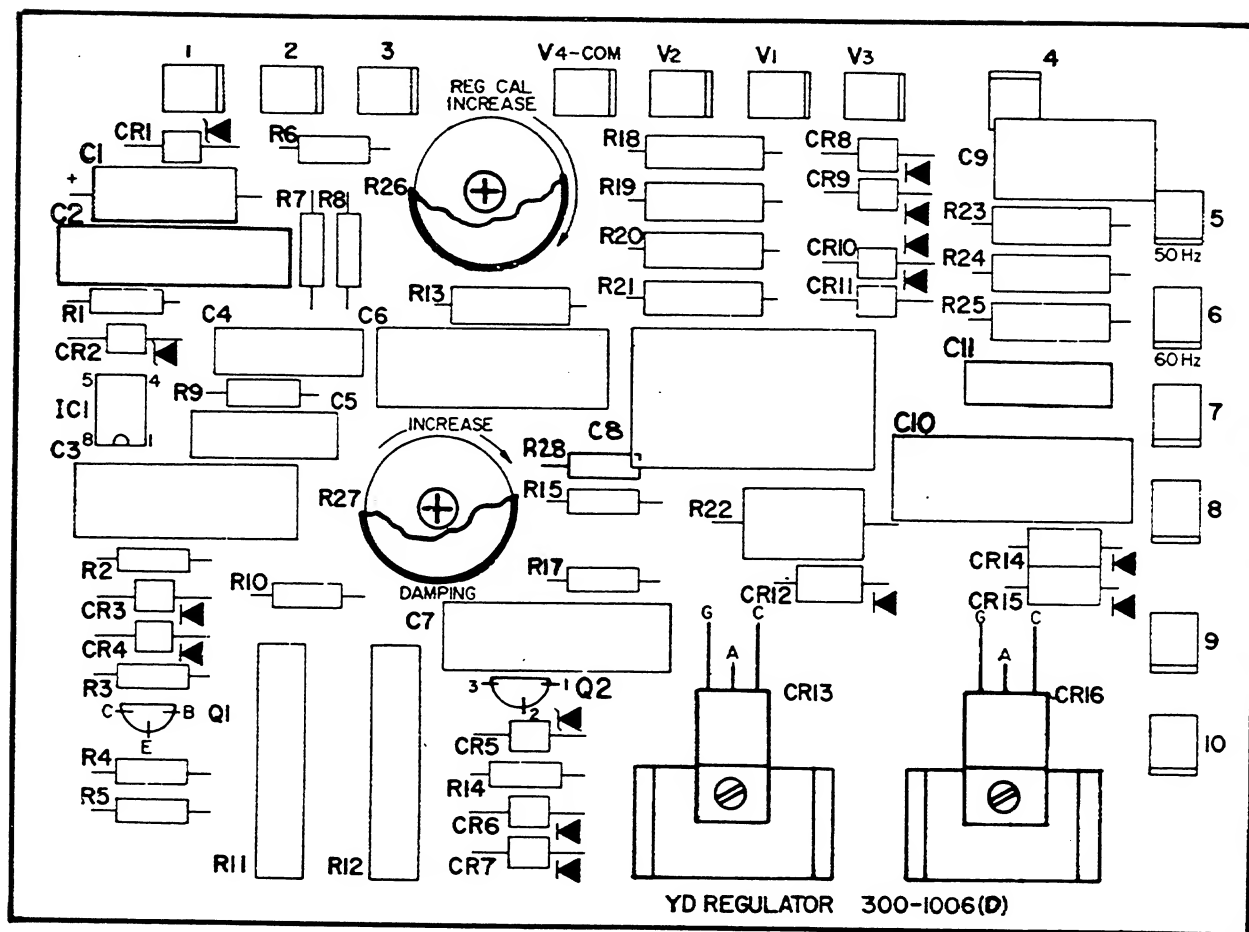
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	305-0546	1	Regulator Assembly, Voltage - Complete
1	301-3917	1	Panel, Voltage Regulator Mounting
2	BOARD ASSEMBLY, REGULATOR (See Separate Groups for Components)		
	300-1404	1	Begin Serial #E760133276
	300-1006	1	Prior to Serial #E760133276
3	315-0386	1	Transformer, Voltage Regulator
4	315-0391	1	Reactor
5	320-0505	1	Breaker, Circuit
6	332-1647	1	Strip, Marker
7	812-0063	2	Screw, Round Head Steel (#6-32 x 1/2")
8	870-0183	2	Nut, Hex with ET Lockwasher (#6-32)
9	812-0068	4	Screw, Round Head Steel (#6-32 x 1")
10	870-0183	4	Nut, Hex with ET Lockwasher (#6-32)
11	812-0061	4	Screw, Round Head Steel (#6-32 x 3/8")
12	853-0003	4	Washer, Lock - ET (#6)

VOLTAGE REGULATOR BOARD (Begin Serial #E760133276)

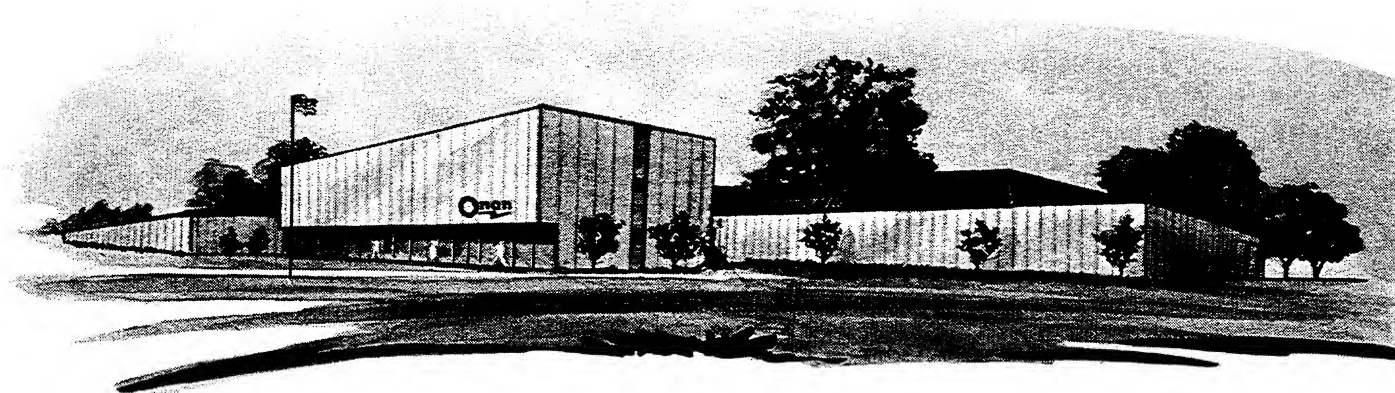


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
C1	300-1404	1	Board Assembly, Complete	R11,12	353-0048	2	Resistor, Wire Wound (4,000-Ohm, 5 Watt)
	356-0039	1	Capacitor, Electrolytic (100 Mfd, 10 Volt)	R13	351-0293	1	Resistor, Film (11,000-Ohm, 1/4 Watt)
C2,6	355-0006	2	Capacitor (.47 Mfd, 100 Volt)	R14	350-0363	1	Resistor (100-Ohm, 1/2 Watt)
C3,7	355-0005	2	Capacitor (.22 Mfd, 200 Volt)	R15,17	350-0351	2	Resistor (33-Ohm, 1/2 Watt)
C4,5,11	355-0015	3	Capacitor (.1 Mfd, 200 Volt)	R18	351-0332	1	Resistor, Film (28,000-Ohm, 1/4 Watt)
C8	355-0016	1	Capacitor (1 Mfd, 100 Volt)	R19	351-0240	1	Resistor, Film (3,090-Ohm, 1/4 Watt)
C9	355-0031	1	Capacitor (.39 Mfd, 100 Volt)	R20	351-0211	1	Resistor, Film (1,530-Ohm, 1/4 Watt)
C10	355-0017	1	Capacitor (.47 Mfd, 400 Volt)	R21	351-0234	1	Resistor, Film (2,670-Ohm, 1/4 Watt)
CR1	359-0036	1	Diode, Zener (5.6 Volt)	R22	350-0973	1	Resistor (270-Ohm, 2 Watt)
CR2	359-0025	1	Diode, Zener (20 Volt)	R23	350-0512	1	Resistor (10-Ohm, 1/2 Watt)
CR3,4,6-11	357-0004	8	Rectifier, Diode (1 Amp, 400 Volt)	R24	351-0353	1	Resistor, Film (46,400-Ohm, 1/4 Watt)
CR5	359-0026	1	Diode, Zener (18 Volt)	R25	351-0349	1	Resistor, Film (42,200-Ohm, 1/4 Watt)
CR12,14,15	357-0028	3	Rectifier, Diode	R26	303-0208	1	Potentiometer (5,000-Ohm, 1 Watt)
CR13,16	365-0002	2	Rectifier, Gate Control	R27	303-0207	1	Potentiometer (20,000-Ohm, 1 Watt)
IC1	367-0005	1	Integrated Circuit	R28	350-0355	1	Resistor (47-Ohm, 1/2 Watt)
Q1	362-0017	1	Transistor, NPN		332-1511	13	Terminal, Lug
Q2	361-0003	1	Transistor, Unijunction		363-0069	2	Heatsink, Diode
R1	350-0423	1	Resistor (33,000-Ohm, 1/2 Watt)		812-0029	2	Screw, Round Head (4-40 x 3/8")
R2	350-0443	1	Resistor (220,000-Ohm, 1/2 Watt)		526-0257	2	Washer, Flat (#4)
R3	350-0447	1	Resistor (330,000-Ohm, 1/2 Watt)		860-0003	2	Nut, Hex (4-40)
R4	350-0398	1	Resistor (3,000-Ohm, 1/2 Watt)				
R5	350-0466	1	Resistor (2 Megohm, 1/2 Watt)				
R6	351-0202	1	Resistor, Film (1,240-Ohm, 1/4 Watt)				
R7	350-0445	1	Resistor (270,000-Ohm, 1/2 Watt)				
R8,10	350-0435	2	Resistor (100,000-Ohm, 1/4 Watt)				
R9	350-0459	1	Resistor (1 Megohm, 1/2 Watt)				

VOLTAGE REGULATOR BOARD (Prior to Serial #E760133276)



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	300-1006	1	Board Assembly, Complete (For Replacement Order 300-1404)	R11,12	353-0048	2	Resistor, Wire Wound (4,000-Ohm, 5 Watt)
C1	356-0039	1	Capacitor, Electrolytic (100 Mfd, 10 Volt)	R13	351-0293	1	Resistor, Film (11,000-Ohm, 1/4 Watt)
C2,6	355-0006	2	Capacitor (.47 Mfd, 100 Volt)	R14	350-0363	1	Resistor (100-Ohm, 1/2 Watt)
C3,7	355-0005	2	Capacitor (.22 Mfd, 200 Volt)	R15,17	350-0351	2	Resistor (33-Ohm, 1/2 Watt)
C4,5,11	355-0015	3	Capacitor (.1 Mfd, 200 Volt)	R18	351-0332	1	Resistor, Film (28,000-Ohm, 1/4 Watt)
C8	355-0016	1	Capacitor (1 Mfd, 100 Volt)	R19	351-0240	1	Resistor, Film (3,090-Ohm, 1/4 Watt)
C9	355-0031	1	Capacitor (.39 Mfd, 100 Volt)	R20	351-0211	1	Resistor, Film (1,530-Ohm, 1/4 Watt)
C10	355-0017	1	Capacitor (.47 Mfd, 400 Volt)	R21	351-0234	1	Resistor, Film (2,670-Ohm, 1/4 Watt)
CR1	359-0036	1	Diode, Zener (5.6 Volt)	R22	350-0973	1	Resistor (270-Ohm, 2 Watt)
CR2	359-0025	1	Diode, Zener (20 Volt)	R23	350-0512	1	Resistor (10-Ohm, 1/2 Watt)
CR3,4,6-11	357-0004	8	Rectifier, Diode (1 Amp, 400 Volt)	R24	351-0353	1	Resistor, Film (46,400-Ohm, 1/4 Watt)
CR5	359-0026	1	Diode, Zener (18 Volt)	R25	351-0349	1	Resistor, Film (42,200-Ohm, 1/4 Watt)
CR12,14,15	357-0028	3	Rectifier, Diode	R26	303-0168	1	Potentiometer (5,000-Ohm)
CR13,16	365-0002	2	Rectifier, Gate Control	R27	303-0164	1	Potentiometer (8,000-Ohm)
IC1	367-0005	1	Integrated Circuit	R28	350-0355	1	Resistor (47-Ohm, 1/2 Watt)
Q1	362-0017	1	Transistor (NPN)		332-1511	13	Terminal, Lug
Q2	361-0003	1	Transistor, Unijunction		363-0069	2	Heatsink, Diode
R1	350-0423	1	Resistor (33,000-Ohm, 1/2 Watt)		812-0029	2	Screw, Round Head (4-40 x 3/8")
R2	350-0443	1	Resistor (220,000-Ohm, 1/2 Watt)		526-0257	2	Washer, Flat (#4)
R3	350-0447	1	Resistor (330,000-Ohm, 1/2 Watt)		860-0003	2	Nut, Hex (4-40)
R4	350-0398	1	Resistor (3,000-Ohm, 1/2 Watt)		517-0127	2	Cover, Potentiometer
R5	350-0466	1	Resistor (2 Megohm, 1/2 Watt)				
R6	351-0202	1	Resistor, Film (1,240-Ohm, 1/4 Watt)				
R7	350-0445	1	Resistor (270,000-Ohm, 1/2 Watt)				
R8,10	350-0435	2	Resistor (100,000-Ohm, 1/4 Watt)				
R9	350-0459	1	Resistor (1 Megohm, 1/2 Watt)				



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